

REMARKS

The present response is intended to be fully responsive to all points of rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Claims 1-47 are pending in this case. Claims 1-17, 32-47 have been rejected under 35 U.S.C. § 112, second paragraph. Claims 32, 39-41, 43-45 have been rejected under 35 U.S.C. § 102(c). Claims 1-31, 33-38, 42, 46-47 have been rejected under 35 U.S.C. § 103(a). Independent claims 1, 18 and 32 and dependent claims 2-17, 23-31, 39, 46-47 have been amended.

With respect to the Examiner's 35 U.S.C. § 103(a) rejections, Applicant has reviewed the cited art and respectfully submits that the art fails to disclose or suggest the Applicant's claimed invention. Therefore, Applicant respectfully traverses and requests favorable reconsideration.

Oath/Declaration

The Examiner has pointed out that the declaration fails to indicate the applicant's post office address. In response, applicant submits an executed Supplemental Declaration that includes the inventors post office address.

Response to Claim Objections

The Examiner objected to claims 1-12, 14, 16-18, 23-29, 39 for various informalities. Applicant has amended these claims in accordance with the Examiner's suggestions.

Substitute Drawing

A missing dashed arrow between block 402 and block 408 in Figure 8 has been corrected. A substitute Figure 8 that includes the missing dashed arrow is enclosed with this Response.

Response to 35 U.S.C. § 112, Second Paragraph Rejections

The Examiner rejected claims 1-17, 32-47 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Amended claims 1-17, 32-47 now feature language which make it clear what the subject matter is that the Applicant regards as the invention. Applicant believes that amended claims 1-17, 32-47 overcome the Examiner's rejection based on § 112, second paragraph grounds. The Examiner is respectfully requested to withdraw the § 112, second paragraph rejection.

Response to 35 U.S.C. § 102(e) Rejections

The Examiner rejected claims 32, 39-41, 43-45 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,459,708 ("Cox et al."). Applicant respectfully submits that the prior art fails to disclose or suggest at least the step of inserting and extracting a timestamp related to the TDM stream into and from the Ethernet frame. Therefore, Applicant respectfully traverses the rejections and request favorable reconsideration.

While continuing to traverse the Examiner's rejections, Applicant, in order to expedite the prosecution, has chosen to clarify and emphasize the crucial distinctions between the present invention and the devices of the patents cited by the Examiner. Specifically, claim 1 has been amended to include a method of transporting a plurality of Time Division Multiplexing (TDM) streams over an Ethernet network, the method comprising the steps of receiving TDM stream data from a plurality of TDM ports, assembling Ethernet frames from the received TDM stream data and inserting therein a first timestamp related to the TDM stream data, forwarding the assembled Ethernet frames to the Ethernet network via an Ethernet interface connected thereto, receiving Ethernet frames from the Ethernet network, extracting TDM data and a second timestamp from the received Ethernet frames and generating TDM streams therefrom, and forwarding the generated TDM streams to an appropriate TDM port in a synchronous manner.

Cox et al. teaches an apparatus and method that enable T1 or E1 telecommunication frames to be transmitted between T1 or E1 telecommunications switches over a high bandwidth packet-switched network. The apparatus includes trunk interface logic and network translation logic. The trunk interface logic is coupled to a central office switch via a central office switch trunk and receives the telecommunications frames from the central office switch. The network translation logic is coupled to the trunk interface logic. The network translation logic translates the telecommunications frames into network packets that the telecommunications frame data may be transferred over the high bandwidth packet-switched network.

It is submitted that the apparatus of Cox et al. is operative to package two E1 data frames into an application packet. Multiple application packets destined to the same destination switch are grouped together by the application envelope logic 510 and inserted into the payload portion of a UDP datagram. The UDP/IP/MAC prefix logic 620 appends a UDP header, IP header, MAC header and Ethernet preamble to the grouped application packets to form an Ethernet packet. The UDP header is appended to allow to allow debugging to occur under a UNIX environment, otherwise the UDP header is not required. See column 15, lines 5-20.

In addition, the apparatus of Cox et al. provides frame queuing by deriving transmission clocks from each E1 transmit stream input into a transmit queue. The E1 channel transmit data is queued for a period of 250 microseconds (i.e. two complete frames) and then dumped to the application envelope logic. See column 14, line 66 to column 15, line 3.

In contrast, the TDM transport facility of the present invention is operative to package a plurality of TDM streams into a single Ethernet frame and is not necessarily limited to only two T1 or E1 frames. In addition, timestamp information related to the input TDM data stream is inserted into the Ethernet frame as well. At the other end, the timestamp information is extracted from the Ethernet frame and is analyzed in generating the TDM stream upon egress from the Ethernet network. This feature is neither taught nor suggested by the Cox et al. reference.

It is believed that amended independent claim 32 overcomes the Examiner's § 102(e) rejection based on the Cox et al. In addition, it is believed that amended dependent claims 39-41, 43-45 dependent on claim 32 also overcome the Examiner's rejection based on § 102(e) grounds. The Examiner is respectfully requested to withdraw the rejection based on § 102(e).

Support for the above amendments can be found in the specification. Specifically, support can be found on page 25, 3-18, page 27, line 28 to page 28, line 13, in Figures 8, 10-12.

Response to 35 U.S.C. § 103(a) Rejections

Claims 1-4, 6-12, 14, 16-25, 27-29, 33-38

The Examiner rejected claims 1-4, 6-12, 14, 16-25, 27-29, 33-38 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,459,708 ("Cox et al."). Applicant respectfully submits that the prior art fails to disclose or suggest at least the step of inserting and extracting a timestamp related to the TDM stream into and from the Ethernet frame. Therefore, Applicant respectfully traverses the rejections and request favorable reconsideration.

While continuing to traverse the Examiner's rejections, Applicant, in order to expedite the prosecution, has chosen to clarify and emphasize the crucial distinctions between the present invention and the devices of the patents cited by the Examiner. Specifically, representative claim 1 has been amended to include an apparatus for transporting a plurality of Time Division Multiplexing (TDM) streams over an asynchronous Ethernet network comprising an ingress buffer for storing TDM data before encapsulation into Ethernet frames, an egress buffer for storing TDM data after received Ethernet frames are segmented, encapsulation means for retrieving TDM data from the ingress buffer, assembling Ethernet frames therefrom, inserting therein a first timestamp related to the TDM data and forwarding the assembled Ethernet frames to the an Ethernet interface,

segmentation means for receiving Ethernet frames from the Ethernet interface, extracting TDM data and a second timestamp therefrom and storing the TDM data in the egress buffer and a processor comprising means for receiving TDM data from a plurality of TDM ports, storing the TDM data in the ingress buffer in accordance with output Ethernet frames and retrieving TDM data from the egress buffer and generating a plurality of synchronous TDM data streams therefrom.

It is submitted that the apparatus of Cox et al. is operative to package two E1 data frames into an application packet. Multiple application packets destined to the same destination switch are grouped together by the application envelope logic 510 and inserted into the payload portion of a UDP datagram. The UDP/IP/MAC prefix logic 620 appends a UDP header, IP header, MAC header and Ethernet preamble to the grouped application packets to form an Ethernet packet. The UDP header is appended to allow debugging to occur under a UNIX environment, otherwise the UDP header is not required. See column 15, lines 5-20.

In addition, the apparatus of Cox et al. provides frame queuing by deriving transmission clocks from each E1 transmit stream input into a transmit queue. The E1 channel transmit data is queued for a period of 250 microseconds (i.e. two complete frames) and then dumped to the application envelope logic. See column 14, line 66 to column 15, line 3.

In contrast, the TDM transport facility of the present invention is operative to package a plurality of TDM streams into a single Ethernet frame and is not necessarily limited to only two T1 or E1 frames. In addition, timestamp information related to the input TDM data stream is inserted into the Ethernet frame as well. At the other end, the timestamp information is extracted from the Ethernet frame and is analyzed in generating the TDM stream upon egress from the Ethernet network. This feature is neither taught nor suggested by the Cox et al. reference.

It is believed that amended independent claims 1 and 18 overcome the Examiner's § 103(a) rejection based on the Cox et al. reference. In addition, it is believed that dependent claims 1-4, 6-12, 14, 16-25, 27-29, 33-38 also overcome the Examiner's rejection based on § 103(a) grounds. The Examiner is respectfully requested to withdraw the rejection based on § 103(a).

Claims 5, 26, 42

The Examiner rejected claims 5, 26, 42 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,459,708 ("Cox et al.") in view of U.S. Patent No. 5,459,720 ("Iliev et al."). Applicant respectfully submits that the prior art fails to disclose or suggest at least the step of inserting and extracting a timestamp related to the TDM stream into and from the Ethernet frame. Therefore, Applicant respectfully traverses the rejections and request favorable reconsideration.

Iliev et al. teaches a system for providing users high bandwidth transmission between remote sites over a public switched digital network. The system includes device access, network access system management and a related method. The invention uses an inverse multiplexing scheme whereby a high bandwidth information stream is split into multiple narrow band signals for transmission through public switched digital network over a plurality of narrow band channels to be received at the remote location by another switched network access system then recombined to form the original high bandwidth information stream.

It is submitted that the apparatus of Cox et al. is operative to package two E1 data frames into an application packet. Multiple application packets destined to the same destination switch are grouped together by the application envelope logic 510 and inserted into the payload portion of a UDP datagram. The UDP/IP/MAC prefix logic 620 appends a UDP header, IP header, MAC header and Ethernet preamble to the grouped application packets to form an Ethernet packet. The UDP header is appended to allow debugging to occur under a UNIX environment, otherwise the UDP header is not required. See column 15, lines 5-20.

In addition, the apparatus of Cox et al. provides frame queuing by deriving transmission clocks from each E1 transmit stream input into a transmit queue. The E1 channel transmit data is queued for a period of 250 microseconds (i.e. two complete frames) and then dumped to the application envelope logic. See column 14, line 66 to column 15, line 3.

In contrast, the TDM transport facility of the present invention is operative to package a plurality of TDM streams into a single Ethernet frame and is not necessarily limited to only two T1 or E1 frames. In addition, timestamp information related to the input TDM data stream is inserted into the Ethernet frame as well. At the other end, the timestamp information is extracted from the Ethernet frame and is analyzed in generating the TDM stream upon egress from the Ethernet network. This feature is neither taught nor suggested by the Cox et al. and Iliev et al. references either alone or in combination.

It is believed that claims 5, 26, 42 overcome the Examiner's § 103(a) rejection based on the Cox et al. and Iliev et al. references. The Examiner is respectfully requested to withdraw the rejection based on § 103(a).

Claims 13, 15, 30-31, 46-47

The Examiner rejected claims 13, 15, 30-31, 46-47 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,459,708 ("Cox et al.") in view of U.S. Patent No. 6,304,574 ("Schoo et al."). Applicant respectfully submits that the prior art fails to disclose or suggest at least the step of inserting and extracting a timestamp related to the TDM stream into and from the

Ethernet frame. Therefore, Applicant respectfully traverses the rejections and request favorable reconsideration.

Schoo et al. teaches a method and apparatus for distributing protocol processing among a plurality of computing platforms. The invention is intended for use in computers such as PCs for establishing connections to other PCs, including Internet access, remote access to corporate backbone networks, video and audio conferencing and Internet telephony. Internet telephony provides a means for users to engage in long distance telephone, audio/visual and/or data sessions using the Internet as the transport medium rather than the long distance public switched telephone network of the inter exchange carriers.

Although, Schoo et al. discloses encapsulating audio frames in RTP packets, Schoo et al. does not teach a general transport facility for carrying any type of TDM data stream T1, E1, T3, E3 or higher data rate TDM streams in the telecommunications digital hierarchy from one location to another. Rather, Schoo et al. is limited to encapsulating audio data in RTP packets (see Figure 13) and to implementing PPP, SLIP and RTP protocol processing. Schoo et al. does not teach combining TDM frames from multiple TDM ports into a single Ethernet frame or encapsulating several TDM frames over a specific time period into a single Ethernet frame.

In contrast, the present invention provides a general facility transport system for transporting any type of TDM data stream such as T1, E1, T3, E3 or higher data rate TDM stream from one location to another. The present invention is not limited to audio or any other type of data, in fact the type of data within the TDM stream is irrelevant for purposes of the present invention.

In addition, the TDM transport facility of the present invention is operative to package a plurality of TDM streams into a single Ethernet frame and is not necessarily limited to only two T1 or E1 frames or audio frames. In addition, timestamp information related to the input TDM data stream is inserted into the Ethernet frame as well. At the other end, the timestamp information is extracted from the Ethernet frame and is analyzed in generating the TDM stream upon egress from the Ethernet network. These features are neither taught nor suggested by the Cox et al. and Schoo et al. references either alone or in combination.

It is believed that claims 13, 15, 30-31, 46-47 overcome the Examiner's § 103(a) rejection based on the Cox et al. and Schoo et al. references. The Examiner is respectfully requested to withdraw the rejection based on § 103(a).

Correction of Typographical Errors

Amendments have been made to correct grammatical and usage errors in the specification. No new matter has been added to the application by these amendments.

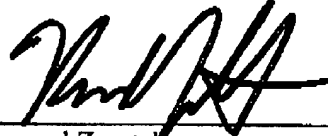
Conclusion

In view of the above amendments and remarks, it is respectfully submitted that independent claims 1, 18 and 32 and hence dependent claims 2-17, 19-31, 33-47 are now in condition for allowance. Prompt notice of allowance is respectfully solicited.

In light of the Amendments and the arguments set forth above, Applicant earnestly believes that they are entitled to a letters patent, and respectfully solicit the Examiner to expedite prosecution of this patent applications to issuance. Should the Examiner have any questions, the Examiner is encouraged to telephone the undersigned.

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Respectfully submitted,



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